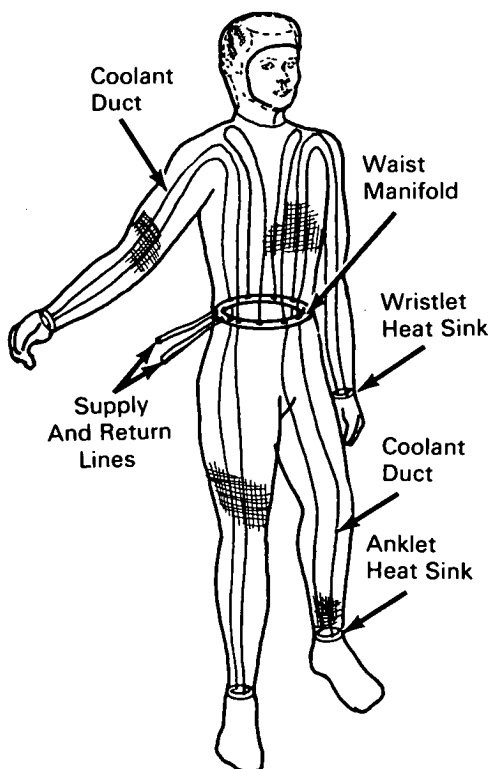


NASA TECH BRIEF



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Concept to Comfort-Condition Subjects Wearing Restrictive Clothing



A heat exchanger has been conceived to maintain a desirable thermal balance in a subject wearing restrictive clothing such as a spacesuit. Existing systems use a cooled or heated gaseous flow within the spacesuit to provide the necessary heat exchange. Such a system is not adequate to prevent thermal discomfort, particularly of the hands and feet, due to the lack of direct heat exchange in these areas. Convective cooling or warming in these areas is difficult to achieve due to the mobility of these extremities.

In this conceptual design, a very fine grid of small diameter, high thermal conductance fibers, in intimate contact with the skin of the subject, transfers heat to or from the subject surface by means of a highly efficient system of ducts, carrying the basic transfer fluid which is maintained at a controlled temperature. In the trunk, arm, and leg sections of the thermal garment, are flexible fluid ducts thermally connected to the grid sections covering those portions of the body. In the hand and foot areas, wristlet and ankle

(continued overleaf)

ducts, respectively are connected to the main ducts and to the grid sections covering these extremities. In all cases, the grid is coextensive so as to cover the body, and, can be readily extended to cover selected portions of the head, if so desired. The transfer fluid ducting is placed strategically about the trunk, arms, and legs to keep the tubing required to a minimum.

Notes:

1. This concept could find use in many applications where temperature extremes adversely interfere with human performance.

2. This development is in conceptual stage only, and, as of date of publication of this Tech Brief, neither a model nor prototype has been constructed.

Patent status:

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